AD 745451

Reinforcement and Perception of Success

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Purdue University

TECHNICAL REPORT NO 42

February, 1972

SEE AD 740812

Prepared in connection with research under the Office of Naval Research, Organizational Effectiveness Research Programs, Contract No. N00014-67-A-0007, NR 177-911.

16

unclassified

Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) Purdue University	2a. REPORT SECURITY CLASSIFICATION
	2b. GROUP
3. REPORT TITLE Reinforcement and Perceptic of Success	
4. DESCRIPTIVE NOTES (Type of report and inclusive dates) Technical Report No. 42	
5. AUTHOR(S) (First name, middle initial, last name) Siegfried Streufert and Glenda Y. Nogami	

6. REPORT DATE February 1972	7a. TOTAL NO. OF PAGES 13	7b. NO. OF REFS 13
8a. CONTRACT OR GRANT NO. N00014-67-A-0007 NR 177-911	9a. ORIGINATOR'S REPORT NUMBER(S)	
b. PROJECT NO.		
c.	9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)	
d.		

10. DISTRIBUTION STATEMENT

This document has been approved for public release and sale, its distribution is unlimited.

11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY Office of Naval Research, Organizational Effectiveness Res.Prog.

13. ABSTRACT

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DD FORM 1 NOV 65 1473 (PAGE 1)

S/N 0101-807-6801

unclassified

Security Classification

14. KEY-WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
reinforcement						
success						
perceptions						
operant conditioning						
probability learning						
learning						
training						

II

Abstract

The effect of three positive reinforcement conditions (operant conditioning, probability learning, and no reinforcement) on perceptions of success by subjects participating in a complex decision making task was investigated. It was found that either reinforcement-manipulation produces greater perception of success, and that perceptions of success tend to increase over time. The results suggest that variables which have been previously shown to be associated with perceived success may also vary with reinforcement conditions.

Reinforcement and Perception of Success

Siegfried Streufert and Glenda Y. Nogami

A number of theories and research paradigms in Social Psychology use concepts derived from learning theory (e.g., learning, conditioning, reinforcement) as one of the underlying principles of human behavior in social settings. Examples are the attraction work of Byrne (1971) and the attitude work of Greenwald (1968) and others.

The extensive literature on learning and the theoretical background of the Hull-Spence view of learning appeared at one point as a rather solid foundation upon which explanations and predictions of human social behavior might be based. Recent discussions of the processes underlying human learning suggest, however, that there is currently only limited agreement on how a stimulus becomes associated with a response (Glaser, 1971). It was all very simple with animals: the association of a stimulus with a response, if produced through an experimental manipulation, was <u>defined</u> as learning. Punishment stimuli (those producing avoidance behavior) and reward stimuli (those producing approach) were viewed as reinforcers. The use of these terms is clear by definition (i.e., the Law of Effect). How the stimulus and the response became associated was of little interest. The animal, panting after making it fast to the goal-box, was after all unable to verbally explain its hurry (and the underlying motivation) to the researcher.

Those studying human verbal behavior have long been unsatisfied with the definitions of learning and reinforcement employed by earlier animal learning researchers. Chomsky (1959) for example attacked Skinner's (1957) definition of reinforcement as "tautological" and his definition of response as "vacuous". The inclusion of an "0" in the more complete

S-O-R chain has, however, created some degree of confusion among learning theorists. A number of different views of the contribution of the "O" to the learning process has emerged. Most of these views can be classified under a general heading which views learning as "information processing." Picking one of these information processing views as the next most likely candidate for the future overall theory of learning appears so far pre-mature. Gagne' (1971) for example decries the "jumping to another prototype" at this time as inappropriate.

The various "information processing" approaches to learning do, however, have some commonalities. They tend to focus on the active participation of the learner ("O") in the process of stimulus-response associations. In other words, the subject in an experiment where learning takes place likely does more than merely respond to an isolated stimulus. A number of mediating processes (Gagne', 1971, for example lists stimulus differentiation, mediation, response familiarization, and more) as well as a number of side effects of learning are likely to occur. The study of these processes appears rather important for a number of reasons: (1) they may modify the environment in which the responding organism is placed and consequently may change his behavior (including learning) in the future,* (2) for the social psychologist they will change the behavior of the learning individual to his interpersonal environment, resulting in potential chain effects on attitudes and other phenomena among a group of persons, and (3) via either of the above two processes they may modify the interpersonal environment to a sufficient degree to introduce confounds into experimental designs.

*This would be particularly important if theories proposing rational processes of learning would prevail (e.g., Buchwald, 1969; Hunt, 1962; Miller, Galanter and Pribram, 1960; Nuttin, 1953; Nuttin and Greenwald, 1968).

Several studies reviewed by Byrne (1971, Ch. 11) suggest that positive reinforcement does indeed have social side effects (e.g., the greater attraction toward a reinforcing person when he metes out more positive reinforcement). Other related research are the attitudinal effects produced via a classical conditioning design obtained by Greenwald (1968), and even the effects of eating on attitudes may be placed into this category.

Some systematic analysis of the effects of reinforcement on a number of social psychological measures appears to be needed. Which measures, for example, are affected differently by positive and negative reinforcement schedules, and which are not affected at all? A further question may be raised about the relationship of "reinforcement-like" variables to effects of reinforcement. For example, to what extent is "success" like reward, and "failure" like punishment? Past research has shown that success and failure perceptions do affect both attributions and attitudes (Streufert and Streufert, 1969), to mention only one example. Would the same results be obtained for positive and negative reinforcement schedules?

The research reported in this and several subsequent papers represents one effort in the direction of clarifying the effects of reinforcement in complex social settings on some measures typically obtained by social psychological researchers. The research reported here is specifically concerned with the degree to which positive reinforcement produces perceptions of success. Previous research has shown that success information to which subjects in complex environments are exposed is accurately perceived (Higbee and Streufert, 1968). Further, it has been demonstrated that the level of perceived success is associated with a

number of social psychological variables (e.g., Streufert and Streufert, 1969). The extent to which those effects might be obtained via reinforcement manipulations would in part depend on the degree to which reinforcement may be associated with (or may be identical to) perceived success.

Method

Subjects and Task

Sixty undergraduate paid volunteers from a mid-western state university were placed in thirty two man decision making teams. Each dyad team was told that they were participants in the Tactical and Negotiations Game (TNG) experimental simulation (Streufert, Kliger, Castore and Driver, 1967). Subjects spent the first two hours* reading a manual providing them with detailed information about current conditions in a mythical country called Shamba. (The situation in Shamba was somewhat similar to the Vietnam war.) After the reading period, participating subjects operated as equal rank decision makers in charge of economic, military, intelligence, and negotiaiton activities of one side in the "Shamba conflict". Subjects believed that they were opposed by another team. In reality they were exposed to a pre-determined experimental program (see below).

Subjects participated in the game for seven 30 minute periods, interrupted only to let them fill out "interim report forms." These

*The two hour reading period has two primary purposes: (1) to familiarize subjects in detail with current conditions in Shamba (aiding the "mundane realism" effect in the simulation, c.f. Fromkin and Streufert, in press), and (2) to somewhat equalize pre-experimental exposures for the subjects.

forms included a number of scales on which the data reported in this paper are based. Subjects did not know which playing period in the TNG would be their last so that an end effect could be avoided.

Subjects made decisions on prepared decision forms and passed these through a mail slot to the experimenters. They were free to make as many decisions as they liked. Any kind of decision was permissible, as long as it could be carried out with the facilities and supplies which were given to the teams. The experimenters supposedly served as "judges" (aided by a computer) determining the outcome of any decision by "comparing" the decisions made by both teams and taking into acocunt a number of other factors (e.g., geographic conditions, population opinion, etc.). In fact, the experimenters merely followed a pre-determined program (see below). Subjects were informed that one of the two teams would be judged "winner" at the end of the game, and that the winning team would receive a bonus payment of $4.-per person.

Manipulation of the Independent Variable.

Subjects were led to believe that any information reaching them was the effect of their actions or the actions of the opposing team. A manipulation check indicated that they indeed attributed more than 75% causality for ongoing events (information received or report forms from the experimenters) to decisions of their own and decisions of the opposing team. Summed Attributions to chance, experimenter produced effects and characteristics of the environment remained below 25%.

All groups of subjects received ten items of information per playing period (one every three minutes equally spaced over time), All items of information were pre-programmed as follows: two contained relevant

military, two relevant economic, one relevant intelligence and one relevant negotiation information. The remaining four messages were irrelevant (cf. Streufert, 1969). The number of items (10 per thirty minute period) was chosen since this frequency of information tends to produce optimum decision making behavior (cf. Streufert, 1970; Streufert and Schroder, 1965).

Of the sixty subjects (thirty dyad teams) one third were placed in an operant conditioning, one third in a probability learning, and one third in a control condition. All information received by the control groups was neutral in character (pre-rated by a parallel population). The operant groups received the same information as the control group, except when they made a complex strategic (integrated)** decision. In this case, the decision was rewarded. The next programmed message (message sequence had been independently randomized for each team) of the type which had been integrated by the subjects was replaced with a message telling the dyad team that their recent decision had produced the desired result. For example, if subjects (1) decided to invest funds in an area where they wanted to gain population support in order to increase the number of volunteers for their armed forces, (2) indicated that they would ask for volunteers in that area later, and (3) if the later move (requesting volunteers) was actually made, then subjects were credited with an integration at the time the subsequent move was made. Since this second move (requesting volunteers) was military, the next military programmed message was replaced with a reward message, e.g., "Your request for volunteers resulted in the desired number of new recruits." Teams averaged 20% reward messages.

**An integrated decision is one which utilizes a person's decision (which was made expressly for this purpose) as a basis for the current decision (cf. Streufert, Clardy, Driver, Karlins, Schroder, and Suedfeld, 1965).

Teams exposed to a "probability learning" manipulation received the same programmed messages as the control groups, except that 2 of the ten messages during each playing period (selected at random from the six relevant messages) were replaced with reward messages. Rewards were of the kind represented by the replaced message.* In other words, reward was again related to the nature of decision making by the dyad. **

Data Collection

After each thirty minute playing period, subjects individually filled out an interim report form, containing a number of scales. One of these scales asked subjects to indicate the degree of success their team had experienced during the last (30 minute) playing period. The end points of the seven point scale were marked "highly successful" and "highly unsuccessful". Data from the first of the seven playing periods was discarded, since that period was viewed as a warm-up period, and since the experimental manipulation was not initiated until the second playing period. Data reported in this paper are based on the six playing periods following that initial warm-up period.

Results and Discussion

The data were analyzed with a mixed design ANOVA and post hoc Newman-Keuls tests. A conditions ($F = 13.9719$; 2/57 df; $p < .01$) and a periods ($F = 11.2152$; 5/285 df; $p < .01$) main effect was obtained. The conditions by periods main effect ($F = 1.6767$) was not significant. Post hoc Newman-Keuls analysis based on the ANOVA error terms indicated that both

*A check on message type frequency indicated that operant and probability learning groups did not differ in the number of message types which had been reinforced.

**Note that the reinforcement manipulation in this research differs from previous success manipulations. While success induction (e.g. Streufert and Streufert,1970) used pre-programmed success messages which were not direct responses (reinforcements) of decisions made by groups of subjects, this methodology employed direct reinforcing responses to specific decisions made by subjects participating in the TNG experimental simulation.

reinforcement conditions differed from the control condition ($p < .01$). Members of dyad teams placed in the control condition viewed themselves as less successful than those who did receive reinforcement. Further, perceptions of success increased with time. Mean success perceptions for the first playing period were significantly below the means of all other periods, ($p < .01$), and success perceptions during the last playing period also exceeded those for the second ($p < .01$) and third ($p < .05$) periods. The results are shown in graphic form in Figure 1.

Insert Figure 1 about here

The results indicate that success perceptions are a function of reinforcement. It should be noted, however, that the levels of perceived success are strongly attenuated in comparison to the results obtained by Higbee and Streufert for a success manipulation per se. In the current research, participants viewed themselves as relatively successful (cf. control group data) even if they received no reinforcement whatsoever. Continuous reinforcement across six playing periods (no matter what reinforcement condition was used) resulted in a relatively high perception of success for the reinforced groups. This level of perceived success is rather similar to that obtained by Higbee and Streufert for 100% success induction.

A number of conclusions may be drawn from this data. First, the data suggest that success and reinforcement are related, although probably not identical. Second, the results seem to demonstrate that it may be valuable to investigate secondary effects of reinforcement on social psychological variables, particularly those which have been shown to

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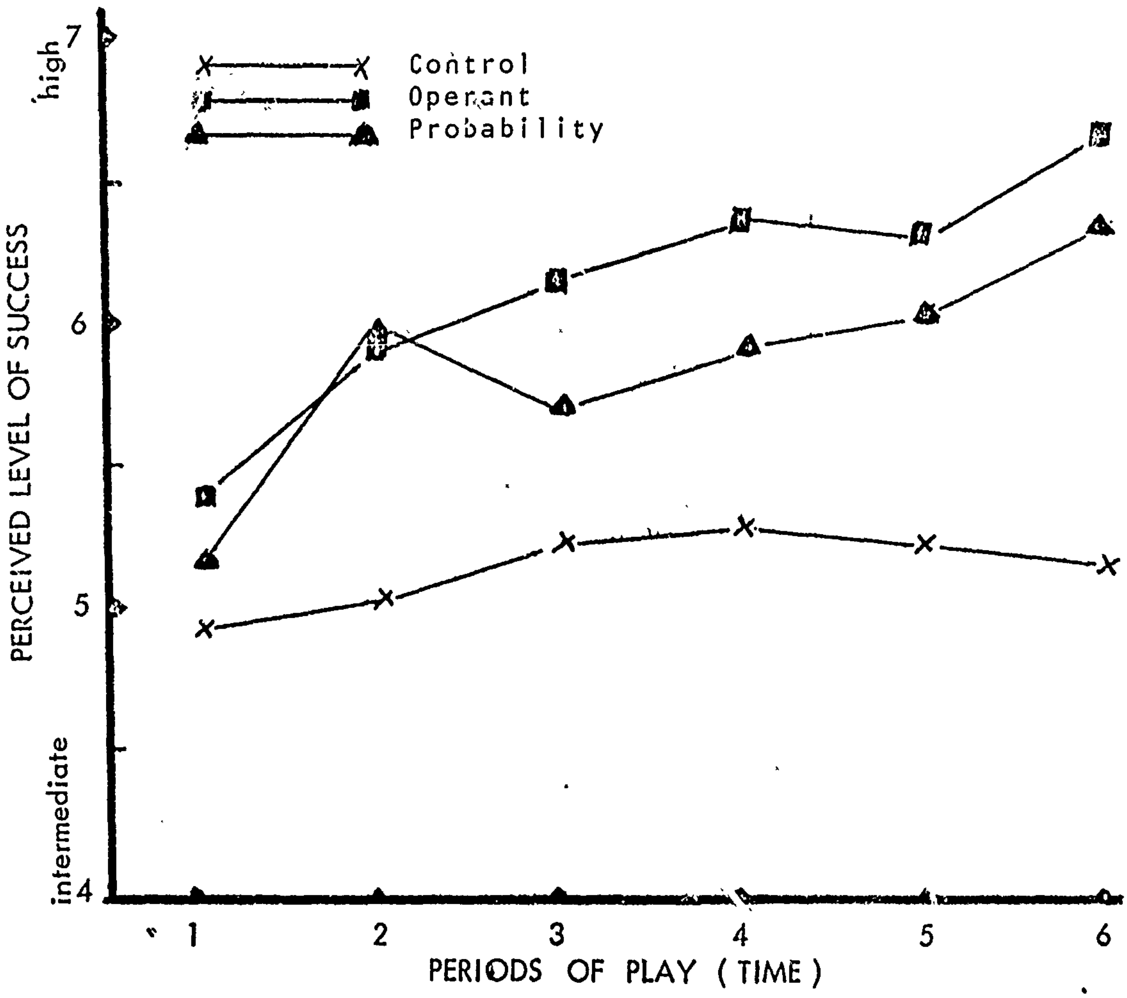

FIG. 1. Effects of Reinforcement (positive) over time on perceived level of success.

be associated with success perception in previous research. Third, it appears that success perception is not dependent on the *kind* of reinforcement condition to which subjects are exposed. Finally, the *kind* of reinforcement utilized appears to have limited effects in complex environments.

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